

## PICTURE OF THE MONTH

### Cellular Cumulus Over the Pacific Ocean

VINCENT J. OLIVER

National Environmental Satellite Center, ESSA, Washington, D.C.

Large areas of cloudiness are frequently observed over moisture-laden oceanic regions. These clouds form as equator-bound unstable polar air is heated from below by the underlying warmer waters. The convection that results from this process produces large areas of cumuliform

clouds. When viewed from the satellite, these clouds appear in cellular patterns. There are two distinct types of pattern: open cellular, composed primarily of cumulus congestus and cumulonimbus (A, fig. 1); and closed cellular, composed primarily of stratocumulus and cumulus

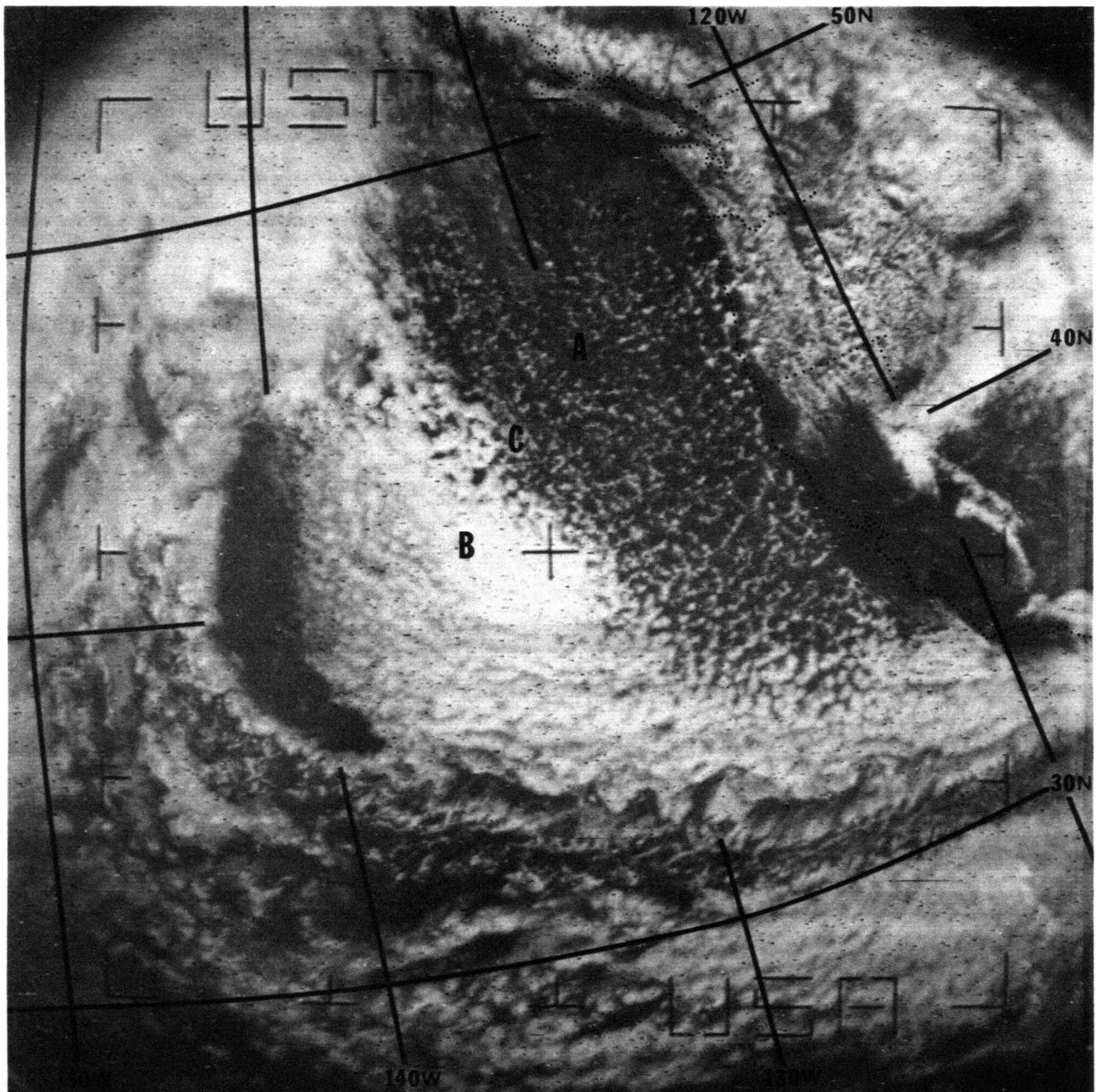


FIGURE 1.—ESSA-6 APT, Pass 1981, 1908 GMT, Apr. 16, 1968.

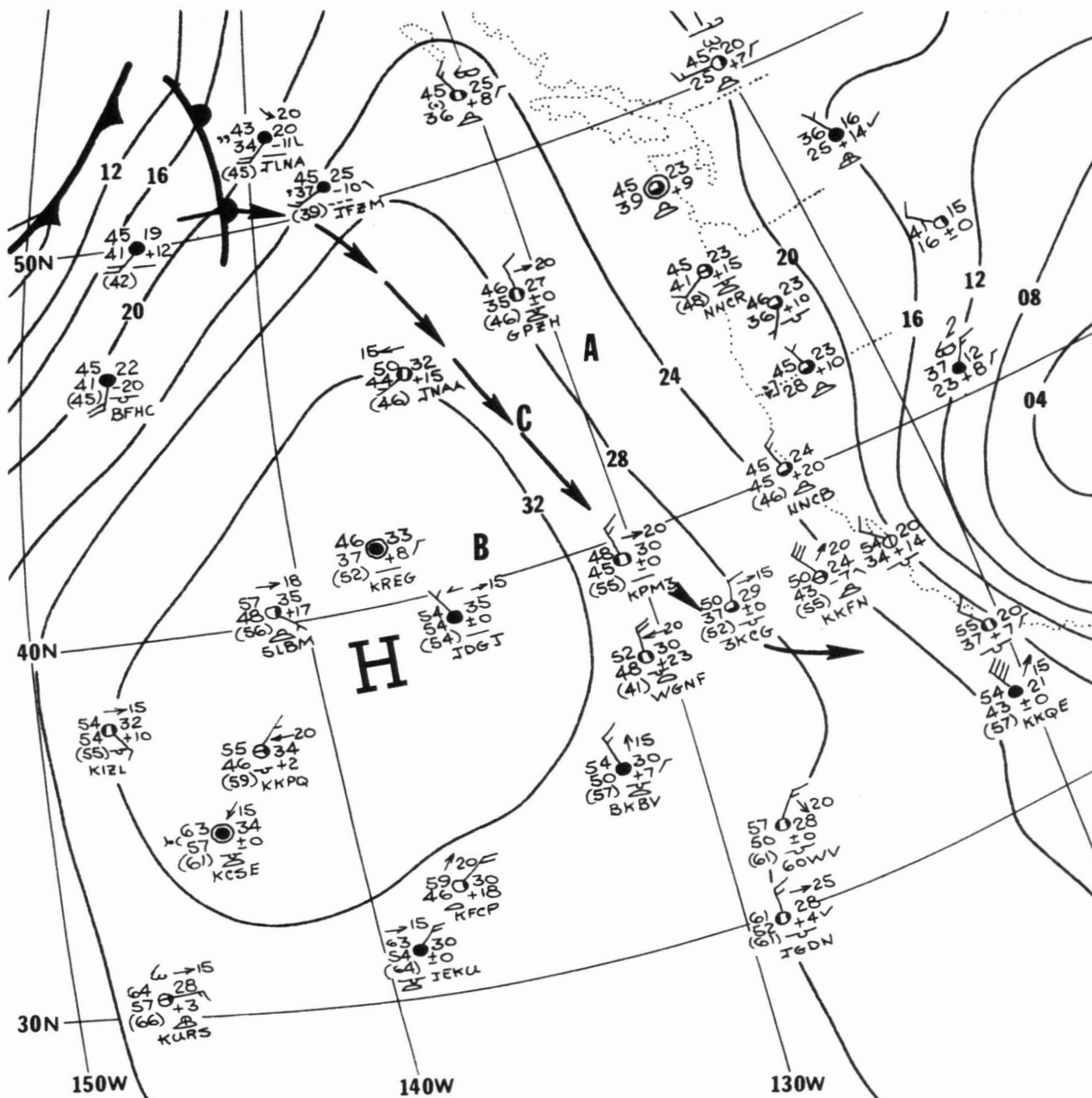


FIGURE 2.—Surface Analysis 1800 GMT, and 200-mb. jet stream, 1200 GMT, Apr. 16, 1968.

(B, fig. 1). The changes from one type of cellular pattern to another has been found to relate to features of the surface and upper air flow.

This ESSA-6 APT photograph (fig. 1), taken at 1908 GMT, Apr. 16, 1968, shows a large cellular cloud field off the West Coast of the United States. At this time, a post-frontal intrusion of cold air had migrated as far south as 30°N. Figure 2 shows the surface analysis at 1800 GMT and the 200-mb. jet position (indicated by arrows) at 1200 GMT on April 16.

Variation in the cellular character of the clouds in figure 1 is associated with the change of curvature in the surface flow. The open cellular pattern, located in an area of deep unstable air, can be seen in the area of cyclonic flow extending southward from 50°N. to 35°N. and eastward from 130°W. to the coast. Where the flow becomes anti-

cyclonic (such as at C), the air becomes more stable and the cloud pattern changes to closed cellular. The jet stream also characteristically separates the two areas of differing stability in this type of flow. Thus the change in cloud form is also observed to lie near the axis of strongest upper level winds.

The clear area centered near 40°N. and 140°W. is near the center of the surface High. Such clearing is often observed with flow patterns similar to this one. It is believed that this clearing occurs when surface winds are too weak to provide the necessary mixing to produce stratocumulus.

These cellular patterns occur frequently in the same relationship to each other with this type of flow and, therefore, can be a useful aid in surface and upper air analysis.